



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/671,324

09/25/2003

Vinod Prakash

1864.001US1

5680

40317 7590 02/27/2009
GLOBAL IP SERVICES, PLLC
10 CRESTWOOD LANE
NASHUA, NH 03062

EXAMINER

GODBOLD, DOUGLAS

ART UNIT

PAPER NUMBER

2626

NOTIFICATION DATE

DELIVERY MODE

02/27/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pnama@globalipservices.com
contact@globalipservices.com
amirdha@globalipservices.com

Office Action Summary

Application No.

10/671,324

Applicant(s)

PRAKASH ET AL.

Examiner

DOUGLAS C. GODBOLD

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2008.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-6,8-12,15-17,19-23,25,26 and 28-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-6,8-12,15-17,19-23,25,26 and 28-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to correspondence filed November 28, 2008 in reference to application 10/671,324. Claims 1, 4-6, 8-12, 15-17, 19-23, 25-26, and 28-32 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 28, 2008 has been entered.

Response to Amendment

3. The amendment filed November 28, 2008 has been accepted and considered in this office action. Claims 1, 5, 12, 17, 21, 25, 28, and 31 have been amended.

Response to Arguments

4. Applicant's arguments with respect to claims 1, 5, 12, 17, 21, 25, 28, and 31 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1, 4-6, 8-12, and 20 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent¹ and recent Federal Circuit decisions² indicate that a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example the methods described in the pending claims can be executed by a human without the use of machine (i.e. one could complete the methods with a pencil and paper).

7. Claims 17, 19, 21-23, and 25-26, rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. These claims are directed to an apparatuses and encoders which, based on the specification for instance page 9 line 9, can be interpreted as only software embodiments, which are considered non-

¹ *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

² *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 4-6, 8, 10, 12, 15-17, 19, 21, 23, 25, and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Fiocca (US Patent 5,732,391).

10. Consider claim 1, Fiocca teaches a method for real-time encoding of an audio signal (abstract) comprising:

grouping spectral lines to form scale band factors by determining masking thresholds based on human perception system (MPEG filter bank 102, and masking in each subband based on psychoacoustics, column 3 lines 13-35);

shaping quantization noise in spectral lines in each scale band factor using local gain (bit allocation column 4 lines 50-67), wherein the local gain of the scale band factor are estimated as a function of band energy ratios and SMRs (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67.

Increasing bit assignment increases bit resolution, which is analogous to local gain), wherein the shaping the quantization noise in each scale band factor such that a

difference between SMR and SNR in each scale band factor is substantially constant (MNR is difference in question, and bits are allocated to lowest MNR; column 4 lines 50-67. inherently after loop is run, the MNR will be more constant); and

running a loop for each scale band factor to satisfy a predetermined bit allocation rate based on a bit allocation scheme (step 6, repeat iteration, column 4 lines 66-67.).

11. Consider claim 4, Fiocca teaches the method of claim 1, wherein shaping the quantization noise in each scale band factor such that the difference between SMR and SNR is substantially constant comprises:

assigning a higher quantization precision to scale band factors having a high SMR (more bits allocated to bands with higher SNR, column 3 line 30); and

assigning a quantization precision to each scale band factor that is inversely in proportion to their energy content with respect to frame energy to desensitize the scale factor bands (fewer bits are assigned to subbands where surrounding subbands have more energy; column 4 lines 42-44).

12. Consider claim 5, Fiocca teaches a single-loop quantization method for band-by-band system (abstract, and figure 2) comprising:

calculating local gain for each band (step 201, initial bit allocation for each subband, column 4 line 7-12. Initial bit allocation determines quantization resolution, which is local gain.); and

shaping quantization noise in each band using local gain (bit allocation column 4 lines 50-67), wherein the local gain of the band are estimated as a function of band energy ratios and SMRs (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain), wherein the shaping the quantization noise in spectral lines in each band such that a difference between Signal-to-Mask Ratio (SMR) and Signal-to-Noise Ratio (SNR) in each band is substantially constant (MNR is difference in question, and bits are allocated to lowest MNR; column 4 lines 50-67. inherently after loop is run, the MNR will be more constant.).

13. Consider claim 6, Fiocca teaches the method of claim 5, wherein shaping the quantization noise in each band using its local gain comprises:

shaping the quantization noise in each band by setting a scale factor in each band based on its psychoacoustic parameters and energy ratio (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain. Masking levels are based on psychoacoustics; column 2 lines 50-53).

14. Consider claim 8, Fiocca teaches the method of claim 5, wherein the spectral lines are derived by performing a time to frequency transformation of the audio signal (filter bank transforms time domain signals to frequency domain signals; column 3 lines 12-22).

15. Consider claim 10, Fiocca teaches the method of claim 5, wherein shaping quantization noise in each band such that the difference between SMR and SNR is substantially constant comprises:

assigning a higher quantization precision to bands having a higher SMR (more bits allocated to bands with higher SNR, column 3 line 30); and

further assigning quantization precision to each band such that the assigned quantization precision is inversely in proportion to their energy content with respect to band energy to desensitize the bands (fewer bits are assigned to subbands where surrounding subbands have more energy; column 4 lines 42-44).

16. Consider claim 12, Fiocca teaches a method for encoding an audio signal (abstract, and figure 2), based on a perceptual model (psychoacoustic model, column 2 lines 50-53), comprising quantization noise shaping of spectral lines on a band-by-band basis using local gain (bit allocation column 4 lines 50-67), wherein the local gain of the band are estimated as a function of band energy ratios and SMRs (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain) such that a difference between SMR and SNR is held substantially constant for each band, wherein the energy ratios are computed by dividing energy in each band over sum of energies in all bands (MNR is difference in question, and bits are allocated to

Art Unit: 2626

lowest MNR; column 4 lines 50-67. Inherently after loop is run, the MNR will be more constant.).

17. Consider claim 15, Fiocca teaches the method of claim 12, wherein shaping quantization noise in each band such that the difference between SMR and SNR is substantially constant comprises:

assigning a higher quantization precision to bands having a higher SMR (more bits allocated to bands with higher SNR, column 3 line 30); and

further assigning quantization precision to each band such that the assigned quantization precision is inversely in proportion to their energy content with respect to band energy to desensitize the bands (fewer bits are assigned to subbands where surrounding subbands have more energy; column 4 lines 42-44).

18. Consider claim 16, Fiocca teaches the method of claim 15, wherein fitting the noise shaped spectral lines comprises:

estimating a bit demand for each band (figure 2, steps 200—203, bits allocated to sub bands); and

allocating the estimated bit demand based on a predetermined bit rate (column 4 line 67, bit allocation ends when no more bits are available, i.e. max bit rate reached).

19. Consider claim 17, Fiocca teaches an apparatus comprising an encoder (audio compression system, abstract) to quantize an audio signal based on a perceptual model

(psychoacoustic model, column 2 lines 50-53) comprising quantization noise shaping of spectral lines on a band by-band basis using local gain (bit allocation column 4 lines 50-67), wherein the local gain of the band are estimated as a function of band energy and SMRs and fitting spectral lines within each band based on a given bit rate (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain), wherein the quantization noise shaping the spectral lines on the band-by-band basis such that the difference between SMR and SNR is substantially constant in each band (MNR is difference in question, and bits are allocated to lowest MNR; column 4 lines 50-67. Inherently after loop is run, the MNR will be more constant.).

20. Consider claim 19, Fiocca teaches the apparatus of claim 17, wherein the local gains are derived from energy ratios and SMRs in each band (MNR is an energy ratio based on SMR, and bits are allocated to lowest MNR, bit allocation being local gain; column 4 lines 50-67.).

21. Consider claim 21, Fiocca teaches an apparatus for coding a signal (audio compression system, abstract) based on a perceptual model (psychoacoustic model, column 2 lines 50-53), comprising:

means for shaping quantization noise in spectral lines on a band-by-band basis using local gain (allocation column 4 lines 50-67), wherein the local gain of the band are estimated as a function of band energy ratios and SMRs (masking to noise ratio is used

to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain), wherein the means for shaping quantization noise in the spectral lines such that the difference between SMR and SNR is substantially constant for each band (MNR is difference in question, and bits are allocated to lowest MNR; column 4 lines 50-67. Inherently after loop is run, the MNR will be more constant.); and

means for quantizing the shaped spectral lines in each band based on a predetermined bit rate (column 4 line 67, bit allocation ends when no more bits are available, i.e. max bit rate reached).

22. Consider claim 23, Fiocca teaches the apparatus of claim 21, wherein means for quantizing of the spectral lines comprises:

means for estimating a bit demand for each band (figure 2, steps 200—203, bits allocated to sub bands); and

means for allocating the estimated bit demand based on a predetermined bit rate (column 4 line 67, bit allocation ends when no more bits are available, i.e. max bit rate reached).

23. Consider claim 25, Fiocca teaches an audio encoder (audio compression system, abstract) comprising a quantizer to shape quantization noise in spectral lines in each band using local gain (allocation column 4 lines 50-67), wherein the local gain of the band are estimated as a function of band energy ratios and SMRs and to further run

a loop to fit the shaped spectral lines in each band within a predetermined bit rate (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain);

a noise shaping module to shape the quantization noise in each band such that a difference between SMR and SNR is held substantially constant in each band (MNR is difference in question, and bits are allocated to lowest MNR; column 4 lines 50-67. Inherently after loop is run, the MNR will be more constant.); and

an inner loop module to fit shaped band within the predetermined bit rate (loop described column 4 lines 50-67, last step checks to see if within predetermined bit rate).

24. Consider claim 28, Fiocca teaches an article comprising:

a storage medium having instructions that, when executed by a computing platform (using a Motorola DSP chip is described in column 3 line 36. It is inherent that some memory must be used in order to store instructions for the processor to function.), result in execution of a method comprising:

encoding an audio signal, based on a perceptual model, by noise shaping spectral lines on a band-by-band basis using their local gains (allocation column 4 lines 50-67), wherein the local gain of the band are estimated as a function of band energy ratios and SMRs (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain), such that the difference between SMR and SNR is

held substantially constant for each band (MNR is difference in question, and bits are allocated to lowest MNR; column 4 lines 50-67. Inherently after loop is run, the MNR will be more constant.).

25. Consider claim 29, Fiocca teaches the article of claim 28, wherein the local gains are derived from energy ratios and SMRs in each band (MNR is an energy ratio based on SMR, and bits are allocated to lowest MNR, bit allocation being local gain; column 4 lines 50-67.).

26. Consider claim 30, Fiocca teaches the article of claim 29, wherein the energy ratios are computed by dividing energy in each band over sum of energies in all bands (masking level is determined in part by the ratio of a band energy with that of surrounding bands in order to determine auditory importance, column 4 lines 40-49).

Claim Rejections - 35 USC § 103

27. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

28. Claims 9, 22, 26, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fiocca in view of Davidson (US Patent 6,246,345).

29. Consider claim 9, Fiocca teaches the method of claim 5, further comprising:

computing local gain for each band (step 201, initial bit allocation for each subband, column 4 line 7-12. Initial bit allocation determines quantization resolution, which is local gain).

Fiocca does not specifically teach:

partitioning the audio signal into a sequence of successive frames; and
forming bands including groups of neighboring spectral lines for each frame based on critical bands of hearing.

In the same field of perceptual audio coding, Davidson teaches:

partitioning the audio signal into a sequence of successive frames (In preferred embodiments, the bank of filters is implemented by weighting or modulating overlapped blocks of digital audio samples with an analysis window function; column 4, line 45); and
forming bands including groups of neighboring spectral lines for each frame based on critical bands of hearing (In FIG. 1, analysis filter bank 12 receives an input signal from path 11, splits the input signal into subband signals representing frequency sub-bands of the input signal... it is common for a split-band encoder and decoder in a perceptual coding system to process many more sub-bands having bandwidths that are commensurate with the critical bandwidths of the human auditory system; column 4, line 30-39).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to complete the steps of windowing and creating subbands based on critical bands as taught by Davidson in order to facilitate the system of Fiocca, as

windowing is required for filter banks of Fiocca to operate properly, and sub-bands must be determined as well before the allocation scheme is enacted.

30. Consider claim 22, Fiocca teaches the apparatus of claim 21, further comprising:
means for performing time-to-frequency transformation to obtain the spectral lines in each frame (filter bank transforms time domain signals to frequency domain signals; column 3 lines 12-22).

Fiocca does not specifically teach:

means for partitioning the signal into a sequence of successive frames; and
means for forming bands by grouping neighboring spectral lines within each frame.

In the same field of perceptual audio coding, Davidson teaches:

means for partitioning the signal into a sequence of successive frames (In preferred embodiments, the bank of filters is implemented by weighting or modulating overlapped blocks of digital audio samples with an analysis window function; column 4, line 45); and

means for forming bands by grouping neighboring spectral lines within each frame (In FIG. 1, analysis filter bank 12 receives an input signal from path 11, splits the input signal into subband signals representing frequency sub-bands of the input signal... it is common for a split-band encoder and decoder in a perceptual coding system to process many more sub-bands having bandwidths that are commensurate with the critical bandwidths of the human auditory system; column 4, line 30-39).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to complete the steps of windowing and creating subbands based on critical bands as taught by Davidson in order to facilitate the system of Fiocca, as windowing is required for filter banks of Fiocca to operate properly, and sub-bands must be determined as well before the allocation scheme is enacted.

31. Consider claim 26, Fiocca teaches the audio encoder of claim 25, further comprising:

a time-to-frequency transformation module to obtain the spectral lines in each frame, wherein the time-to-frequency transformation module to form bands by grouping neighboring spectral lines with each frame (filter bank transforms time domain signals to frequency domain signals; column 3 lines 12-22).

Fiocca does not specifically teach:

an input module to partition an audio signal into a sequence of successive frames.

In the same field of perceptual audio coding, Davidson teaches:

an input module to partition an audio signal into a sequence of successive frames (In preferred embodiments, the bank of filters is implemented by weighting or modulating overlapped blocks of digital audio samples with an analysis window function; column 4, line 45).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to complete the steps of windowing and creating subbands based on

critical bands as taught by Davidson in order to facilitate the system of Fiocca, as windowing is required for filter banks of Fiocca to operate properly, and sub-bands must be determined as well before the allocation scheme is enacted.

32. Consider claim 31, Fiocca teaches a system (audio compression system, abstract) comprising:

- a processor (Motorola processor column 3 line 37);

- a memory coupled to the processor (using a Motorola DSP chip is described in column 3 line 36. It is inherent that some memory must be used in order to store instructions for the processor to function);

- an audio encoder comprising a quantizer coupled to and the processor to shape quantization noise in spectral lines in each band using local gain (allocation column 4 lines 50-67), wherein the local gain of the scale band factor are estimated as a function of band energy ratios and SMRs (masking to noise ratio is used to determine where bits are allocated, steps 2 and 3, column 4 lines 50-67. Increasing bit assignment increases bit resolution, which is analogous to local gain) and to further run a loop to fit the shaped spectral lines in each band within a predetermined bit rate (column 4 line 67, bit allocation ends when no more bits are available, i.e. max bit rate reached);

- a noise shaping module to shape the quantization noise in each band such that a difference between SMR and SNR is held substantially constant in each band; and an inner loop module to fit shaped band within the pre-determined bit rate (MNR is

difference in question, and bits are allocated to lowest MNR; column 4 lines 50-67.

Inherently after loop is run, the MNR will be more constant.).

Fiocca does not specifically describe:

a bus;

the processor couples to the bus; and

a network interface coupled to the processor and the memory.

In the same field of perceptual audio coding, Davidson teaches

a bus (bus 91);

a processor coupled to the bus (DSP 92); and

a network interface coupled to the processor and the memory (I/O control 95

represents interface circuitry to receive and transmit audio signals by way of communication channel 96; column 20, line 25).

Therefore it would have been obvious to one of ordinary skill in the art to use a computer system as described by Davidson as a means of executing the method of Fiocca in order to allow for the method to be executed on a general computing platform.

33. Consider claim 32, Fiocca teaches the system of claim 31, further comprising:

a time-to-frequency transformation module to obtain the spectral lines in each frame, wherein the time-to-frequency transformation module to form bands by grouping neighboring spectral lines with each frame (filter bank transforms time domain signals to frequency domain signals; column 3 lines 12-22).

Fiocca does not specifically teach:

an input module to partition an audio signal into a sequence of successive frames.

In the same field of perceptual audio coding, Davidson teaches:

an input module to partition an audio signal into a sequence of successive frames (In preferred embodiments, the bank of filters is implemented by weighting or modulating overlapped blocks of digital audio samples with an analysis window function; column 4, line 45).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to complete the steps of windowing and creating subbands based on critical bands as taught by Davidson in order to facilitate the system of Fiocca, as windowing is required for filter banks of Fiocca to operate properly, and sub-bands must be determined as well before the allocation scheme is enacted.

Allowable Subject Matter

34. Claims 11 and 20 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 101, set forth in this Office action.

35. The following is a statement of reasons for the indication of allowable subject matter: The Prior art of record does not teach or fairly suggest alone or in combination the following equations used for deriving local gains:

$$K_b = \text{int}(\alpha * \log_2(en(b)/sum_en) + \beta * \log_2(SMR(b)))$$

wherein $K6$ is the local gain for each band, \log_2 is logarithm to base 2, $en(b)$ is the band energy in band b , $\sum en$ is total energy in a frame, $SMR(b)$ is the psychoacoustic threshold for band b , wherein a measures weightage due to energy ratio, and fl is a weightage due to SMRs.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DOUGLAS C. GODBOLD whose telephone number is (571)270-1451. The examiner can normally be reached on Monday-Thursday 7:00am-4:30pm Friday 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/671,324
Art Unit: 2626

Page 20

DCG

/Patrick N. Edouard/
Supervisory Patent Examiner, Art Unit 2626